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Lieut. J. H. Doolittle flying Curtiss Hawk upside down. Note shadow of wheel on the wing.

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Special Features

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Five Years of Progress

Fuel for the Wright Whirlwind

How and Why an Airplane is Static Tested

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Vol. XXII

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No. 29

Adequate Housing

AT THE present time a condition exists which is tending to prevent respectable men from staying in our air corps, and which is seriously impairing the work of our whole force. Reference is made to the housing conditions at many of the air stations.

During the war an emergency existed and it was necessary to put up a large number of buildings in a very short time. As the buildings were only supposed to last for a year or so they were hastily thrown together out of the cheapest material. Yet after ten years they are still housing the major part of the personnel of our air corps. One can usually tell a good deal about a man from the surroundings in which he lives, and, as the rooms now, the surroundings will have an effect on the man. An officer who is forced to live with his wife and family in a shanty through which the wind blows and which is not water tight will either consider the service or he will be as sloppy as his air conditions and too, the right type of enlisted men will not be attracted to stay by the air service unless they are comfortably housed.

The housing question applies to the whole army but more especially to the air corps for most of our barracks were developed during the war and the bulk of us are an emergency nature. There are no reasonable words for immediate expenditures that it is the hard to take a far sighted and statesmanlike view of expenditures, but the need for proper housing for our air men is one of such importance that it should not be delayed any longer. Those interested in aviation should make it an effort to remedy a situation which is a shame to the United States and which seriously impairs the efficiency of the air corps.

The Guggenheim Competition

IT IS rather a curious fact that five out of the seven men who entered the Guggenheim Race Airplane Competition are European and that so far there are only two American entrants. This however does not necessarily indicate that Americans take no interest in the competition but it can be traced rather to conditions which now exist in the aircraft industry in this country.

At the present time every factor is extremely busy and there are orders well ahead on their books for the year and preparations for next year have required large amounts of work.

ing capital. It is therefore only natural that capital and brain power should have gone into filling the immediate need and that temporarily at least the American aircraft industry should be more interested in meeting the demand for a product which is saleable and hence apparently satisfactory than in doing experimental work which is extremely costly and where no market has as yet been developed.

The Guggenheim competition is certainly a move in the right direction and the winner will be well rewarded financially, and there is little doubt that there will also be a great demand for this type of plane. It is to be hoped that during the next year there will be several more responsible American entrants in the competition.

Airport to City Transportation

ONE OF the main features of aerial transportation, and one that air transport companies have badly hood since their inception, has been the issue of speed. At every turn they have advanced the airplane as the great time saver in traveling between cities. Yet, strange as it may appear, there have been instances where the time from hotel to hotel via airplane was a little less than the time from hotel to hotel via the railroad that the saving was not worth the additional expenditure in transportation fees.

However, such a condition was not due to the airplane or the air route involved. On the contrary, the delay was due entirely to poor and inadequate means of transportation from the airport to the city proper.

There are, in this country, many airports that are located adjacent to street car or motor bus lines. Others, and so unfortunately located, have been taken care of by the inauguration of bus lines by either the airport owners or the transport companies operating to and from that point. However, these are a few airports, miles removed from the heart of the city, with no means of rapid transportation and the air traveler must depend upon the kind heartedness of some passing motorist.

Such, of course is a detriment to air travel as regards inducing laymen to patronize air lines. And it would seem altogether fitting for the officials of such airports to install some means of adequate transportation to the passenger's ultimate destination and thus boost business, rather than let the matter continue to slide and injure the chances of the future patronage of the air traveler who was forced to seek his heels on the grid for an hour or so before he was fortunate enough to obtain a lift to town in a private car.



Five Years of Progress

An Interview with B. F. Mahoney

By ANDREW B. DIXON

THE B. F. Mahoney Aircraft Corp. of San Diego, Calif., is still going full speed ahead! Last month we celebrated our fifth year of existence, having carried some one first place back the air 21,981 passengers over a distance of 80,000 mi.—equivalent to 25 times around the world—without a single fatal accident to pilot, student or passenger.

As the world knows our organization built Col. Charles A. Lindbergh's New York-Paris monoplane. From the beginning through the period of building Colonel Lindbergh's plane to the present, we have grown from an organization of one pilot and one mechanic carrying passengers in a single "Dewar" off a baseball field, to an organization now employing more than 100 men, with a weekly payroll aggregating a little more than 2,500. Add to this the building of the only experimental plane in history which has completed a 30,000-mile tour nearly one month ahead of schedule, without a delay in the tour due to faulty plane or engine, and you will note a record of which scarcely we feel proud. That plane has dashed over across the Atlantic and been flown three times across the American continent, a fine record for any man-made means of locomotion.

The corporation was established originally as the Ryan



B. F. Mahoney, president of the B. F. Mahoney Aircraft Corp., San Diego, Calif. Above: A Ryan-Broughman flight.

Flying Co. It then was a co-partnership between B. F. Mahoney and T. C. Ryan. Later these two were organized as the Los Angeles-San Diego Airline, the first passenger-carrying airline in America operating as a daily service between the two cities. It was the first to operate at a profit. The name was changed to Ryan Airlines and in 1925 Ryan disposed of his interest to his partner, leaving the B. F. Mahoney Aircraft Corp.

Our first plane was known as the Ryan M-1, which style was adopted for some air mail work. In development of the M-2, a slightly larger of two types were sent as a basis for rehabilitation designing of a plane suitable for a flight from Los Angeles to Paris. We sent our pilot to the modeling of plane. Our hopes rather flew successfully with it into the North Atlantic. For two months staff gave Colonel Lindbergh all their attention, with him nevertheless.

Our engineering department was required to a

November 1, 1927

test that it would carry 450 gal. of gasoline and make a cruising speed of at least 100 mi. per hour. The actual performance of the plane was a cruising speed of 165 m.p.h. and a maximum speed of 180 m.p.h. The actual performance of the plane was a cruising speed of 165 m.p.h. and a maximum speed of 180 m.p.h. The actual performance of the plane was a cruising speed of 165 m.p.h. and a maximum speed of 180 m.p.h.

Lindbergh said on arriving at Paris, "As a matter of fact, I had what I regarded and still regard as



The B. F. Mahoney Aircraft Corp. factory at San Diego, Calif.

the best flying plane to make the flight from New York to Paris.

In preliminary tests on this plane at Camp Kearney, near San Diego, took and started tests with loads varying from 400 to 1000 gal. of gasoline, the plane again previously passed all the engine's requirements. It produced the actual test at that time of taking off with 1000 lbs. of weight in 1000 ft. and the more weight feet of landing when no damage whatever to the landing gear with more than 70 times its weight on wheels land.

Back to the quality and stability of our present monoplane!



The "Spirit of St. Louis" being received by students of the Mahoney School of Aviation.

Men keep airplanes only after investigation. They think of aircraft both in terms of dollars and life. They want safe craft, and for the purposes our planes are designed to do, they want planes of a fairly reasonable cost. Satisfied that the Mahoney monoplane meets both requirements, our customers have ordered for in advance of production, and they include the U. S. Department of Commerce and many large American corporations. Foreign shipments have been made to Australia, New Zealand, Canada, Japan, Mexico, Hawaii, Central and South America. From Point Barrow, Alaska, to Mexico, Mahoney planes are in daily operation, carrying passengers, express, mail and private cargo. Also representative from Greece, Brazil, China, Great Britain and Scandinavia are negotiating for planes.

Our plans now call for two developments—the international marketing of a single type plane, the Broughman; and the conduct of a school for pilots. The latter will be held at San Diego, where our plant is located. The method here will be of interest far, in a sense, we apply the "radio-graphic" to aviation. We will issue two types of diplomas, the type depending upon the time a student requires in com-



The banquet given in honor of Col. Charles A. Lindbergh upon his return to the starting point of his journey San Diego-New York-Paris flight.

giving his instructions. Each student also will be required to pass a test on national and international regulations. So there will be a provision on a pilot's adaptability. Those who learn more rapidly will be graduated earlier and awarded a diploma on stating. But more of this later.

Our standard plane will be the Brougham, and, with Wright Whirlwind engine, will be standard production plane for some months to come. The engine's place constantly to improve the model. The research laboratory is also experimenting on a low-powered engine to be introduced some time during 1938 or 1939, depending upon the success of present experiments. Donald Hall, our chief experimental engineer, believes it will prove feasible to get excellent efficiency from low-powered planes, and, according to economy and cost the present low powered automobiles. Within a few years, he predicts, airplane costs will get down 30 to 40 per cent to a plane of that with a light, one- and two-passenger plane, with an engine developing between 20 and 30 hp. He sees also the possibility of great speed in these little planes.



Donald Hall, chief experimental engineer of the B. F. Mahoney Aircraft Corp. Recently chief draughtsman for the Douglas Company of Santa Monica, Calif., Donald Hall, designer of the "Biplane of St. Louis" and formerly with Curtiss and later with the Brougham Company, W. F. Shott, O. H. Clark, O. F. Hammond and C. F. Book, not including a number of draughtsmen contributing on current production.

A. J. Edwards, vice sales manager, secretary-treasurer and member of the board of directors, came to the corporation with a background of motorcycle automobile experience. At one time he held engine automobile road race record out of Portland, Ore. Later he had charge of Strohbecker sales at Portland and still later at Wichita, Kan. He came to San Diego from Muskogee, Okla. His efforts as sales manager are reflected in the present situation—production still many weeks ahead.

From early 1914 to 1917 W. H. Bechen was an experienced airplane engineer. He designed and flew several types of planes and overhauled and repaired the engines of several power driven airplanes. During the war he was attached to the 43rd Squadron, U. S. Air Service, and returned to the United States as flight test reporter at McCook Field. In 1924 he was appointed test pilot and plane construction foreman of the original Ryan company. At the present time he is factory manager and member of the board of directors.

Donald Hall, chief experimental engineer, began his training at the Manual Training High School, Brooklyn, N. Y. His practical engineering experience began when he was employed by the Curtiss Aeroplane and Motor Co., Inc., from

1919 to 1921 as airplane draftsman and checker. He went later to McCook Field for experimental work, for a time with the Douglas Company and came to Ryan Airplane in 1925 as engineer. His most notable work was designing the "Biplane of St. Louis".



W. A. Mosley, engineer in charge of current production.

When he was instrumental in designing and developing the McCook biplane, the first airplane to fly across the Atlantic. Later he designed for the Douglas company the Army Warplane, first plane to fly around the world; the Douglas observation plane, adopted by the Army Air Service, the Douglas Army transport and numerous commercial designs.

Through the able assistance of these men and others we are now producing two Broughams weekly and we expect to begin to have increased our production schedule to four.

Thus we hope to do through the cooperation of the engineering department and the factory people. The engineering department, by the way, is perhaps our most important unit. It is strictly up to date and is probably the largest of any aircraft manufacturing company.



A. J. Edwards, vice manager of the B. F. Mahoney Aircraft Corp.

These parts of the country which boast good airports will go ahead more rapidly than elsewhere. What else is to look at railroad station progress? The analogy is perfect.

We hope our improvements always will keep our product steadily up to date. The plan calls for our engineers to

consider kind of every improvement. Mr. Hall, a fine artist, is a skilled experimental engineer. His ideas present themselves and all improvements may be incorporated almost immediately. In that way our designs may be assumed of the product being always up to date.

The starting point? Simple. The plane must be built at all costs, 10,000, whatever equipped. There is no point in building a plane and not having it. We will supply a single engine plane at a price which will make it, and we were willing to start production before long profit. The plan is fundamental and vast. Our manufacturers before to have learned it.

There is the foreign market. There are two big "foreign" markets right at our doors, without going half-way around the world for them. In Canada and in Latin America we are going to develop for distribution of single engine motor planes. Our foreign inquiries are very increasing and already a good many sales have resulted. Par-



W. H. Bechen, factory manager of the B. F. Mahoney Aircraft Corp.

ticularly in North America, with the possible exception of a few more, it is the construction of a small number of motor planes. Now the one is a good selling plan. But to find from the market to make a big thing. At least two more are planned in the near future. We had an airplane that serves the defense in our home, manufacturing factory in the United States. We will use one of our design experience in the United States. These designs have been fully tested, the selection has been based on money, a wide life of trade, a solid and the most restricted and superior. Finally, the plan is good, the market is good, the market is good, the market is good.

I must emphasize the importance of our large engi-

neering department. It is the safeguard to our customers that they will receive planes which embody the latest developments and refinements. For those who do not know, the Brougham is a Wright Whirlwind equipped motor plane. Already disseminating across have given it a few symptoms. It is a worthy companion to the "Biplane of St. Louis". Many refinements of construction characteristic of the plane built for Colonel Lindbergh are embodied in the Brougham.

One Day Service to Cuba

ACCORDING to a report by the Associated Press of the Department of Commerce through air mail and passenger service from New York City to Havana, Cuba will be possible in one day with the extension north to Miami, Fla. of the present air route from Havana to Key West.

This service is made possible by the new air mail contract route between Atlanta and Miami on which proposals have been issued recently. Service for passengers only of the new Miami service is in the 1938 program of the Department beginning July 1, 1938.

The Miami route is 625 mi. each way. It will connect directly with the new New York-Atlanta route to be put in operation soon by Pan American Aviation, Inc. The two routes combined will allow mail leaving Hazy Field at New York at 9 P. M. to arrive at Miami at 12:40 the following day, about 15 hr., one whole day faster than the present mail service. The 80 mi. from Miami to Key West could be flown in about an hour, leaving only the 148 mi. route already established from Key West to Havana to be traversed.

Spokane Races Financial Success

FOR THE first time in its history, the national air race paid their way in 1937, according to figures filed with the National Air Derby Association of Spokane by public accountants who have audited the books.

Total receipts, including funds raised from ticket sales, merchandise and miscellaneous sources, amounted to \$134,000 while expenditures totaled \$113,186. In all \$20,814 was paid out in prize money and \$29,631 for trophies and other expenses directly incidental to contests.

With only a few days of a few dollars each outstanding, the association showed net profits of \$208 and the \$20,814 in prize money, paid by Spokane business men, was all paid back. The prize, which had been earned by the leaders, were returned to the makers, without interest.



Photo of the original Ryan Flying Co. biplane at San Diego Field.

Why and How an Airplane is Static Tested

By W. E. SAVAGE

Chief of Structures Unit, C.A.A.E.C.
Naval Division, Wright Field, O.



W. E. Savage

AFTER THE engineer has completed his stress analysis of a proposed airplane, which guides him in choosing the sizes for the structural members, that go to make up the airplane structure, his first thought is to subject the complete airplane structure to a weight carrying or static test. All static loading is done on the ground before the newly designed airplane is put through any violent maneuvers during flight so that any error made, wrong method employed, or bad



Fig. 2. Static test of horizontal tail surfaces.

judgment made in choosing the size of individual members, when the structure contains such members, will be corrected and not cause any serious results to the airplane and pilot.

When referring to the structural strength of airplanes the term "Factor of Safety" is not used since the "Factor of Safety" varies with the attitude of flight or maneuver the airplane may be in or is capable of making, or with a variable load which may be carried in the fuselage or body.

The term "Load Factor" is used for specifying the structural strength of the airplane while the loaded surfaces, and also, have their strength properties specified in pounds per square foot.

The required structural strength of an airplane will depend upon the purpose for which the airplane is designed. The slow moving or low carrying airplane is required to support a lower load than the faster moving or pursuit type airplane. This may be explained by the simple experiment of swinging a bucket of water around in a circle and noting the increase

in the pull as the speed is increased, and having the water stay in the bucket at the top of the circle explains the reason why the pilot does not hang on his belt at the top of a loop, but of course if the airplane goes too speed while in this position the force that prevents the water in the bucket from spilling, which is called centrifugal force, will become so time that of gravity and the pilot will hang on his belt. Another and better reason for requiring a pursuit or fast moving airplane to support a higher load is that when these types of airplanes are pulled out of a dive quickly or the direction of flight changed quickly the loads on the airplane are increased and found to be nearly eight times the load that the airplane would have in normal or level flight. These test loads must be considered in both the stress analysis and in the static test of the airplane.

In the static test of an airplane there are several distinct tests made while there may be so many panel tests that



Fig. 3. Static test of the vertical tail surface.

are really static tests not carried to destruction, are carried high enough to cause any member of it to be stressed beyond its elastic limit.

The two tests are, and they may be made in the horizontal tail surfaces and controls, vertical tail

surfaces and ailerons control, inverted flight tests, low incidence wing tests, high incidence wing tests, landing gear tests, tail shock tests, and a test of the wing ribs. The test for wing ribs or for testing may be either static or load carrying or load to 50 and 200 lb. bars. The test may consist of a large or different weight under it, handle and put in the proper position which is set at the weight. The load shock bars are collapse test where material of a higher strength did due to the small space while the load bars of 200 lb. are used to load the engine mount. The horizontal tail surfaces, which should be in the fuselage, the load is so placed on the surface



Fig. 4. Inverted load on the wings.

to simulate the condition of flight and the magnitude of the load depends upon the type of airplane being tested. However, in all types of airplanes the load imposed on the horizontal tail surfaces is put on in increments of five pounds per square foot with a decrease in magnitude of the increment as the design or breaking load is reached. After each increment is added the ground pull required on the control rods necessary to move the load imposed on the elevator, is measured by a spring balance connected to the control stick. This place on the stick where the pilot would grip it. A photograph of the load on the horizontal tail surfaces and the spring balance connected to the control stick is shown in Fig. 5.

The vertical tail surfaces may be tested in a similar manner, but instead of measuring the pull on the elevator control is put in the rudder bar is measured. A photograph of the loaded vertical tail surfaces is shown in Fig. 6.



Fig. 5. Inverted load on the wings.

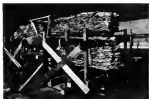


Fig. 6. High incidence load on the wings.

is applied to the surfaces in a manner similar to that in which it is applied to the elevator while the side pull on the control stick is measured instead of the pull down and left as in the test of the horizontal tail surfaces.

In testing the wings of an airplane they should always be assembled to the fuselage using the same type of fastenings as have been previously tested. By following this method that portion of the fuselage affected by the wing loading will be thoroughly tested. The members in the fuselage that are tested will be the tension members carrying the load from one side of the wing to the other and the struts in the fuselage that carry the compression loads.

The inverted flight wing load shown in Fig. 7, will be imposed on the wing when the airplane is at the top of a slow loop or when it is flying upside down. The center of gravity of the static load will vary depending upon the airfoil used,



Fig. 7. Static test of the fuselage.

or the shape of the cross section of the wing, but a fair average value of the position of the center of gravity of the load is 30 per cent. of the wing chord measured from the leading edge of the wing. The wing chord just referred to is the distance from the leading edge to the trailing edge of the wing.

In the low incidence wing test, shown in Fig. 8, the complete airplane is turned upside down, supported rigidly by a heavy frame under the fuselage with the wing set at an angle so that the load when applied will produce a force parallel to the lower surface of the wing and one perpendicular to it. These forces commonly called drag and lift forces will vary depending upon the type of airplane and some tests forms vary, the angles at which the airplane is set for test will vary but an average value is about 8 deg. In the low incidence test, which represents a combination of high speed and diving con-

dition, the leading edge will be lower than the leading edge of the wing and the center of gravity of the load will be placed between 45 and 60 per cent. of the wing chord measured from the leading edge of the wing depending upon the aerial use and the type of airplane tested. The load is applied to the wings in increments which are decreased in magnitude as the required load is reached.

The high endurance wing test shown in Fig. 5, which corresponds to pulling out of a dive quickly, is conducted in a



Fig 7. Dynamic test of the landing gear

maneuver similar to the way in which the low resistance test is conducted only the surface must be kept in contact with the leading edge of the wing along the entire length. The angle is such that the wing is set well back with only a slight to right lean. Again, the wing is set with the leading edge up, the trailing edge down and will be set-down and lift forces instead of drag and lift forces as produced by the lead in the low resistance wing test. The center of gravity of the lead will move forward to about 30 percent of the chord measured from the leading edge of the wing. Of course, the position



Fig. 8. Dynamic test of tail stud

of the center of gravity of the load which corresponds to the center of pressure of the wing in flight will vary depending upon the characteristics of the aerial load. The high confidence wing test is carried to failure while the inverted flight and low confidence tests are carried only to their required or design load.

After the high incidence wing test the airplane is ready to be turned right side up to test the fuselage as shown in Fig. 8. This may be accomplished by applying a load for each

and hydraulic lift handles. The wheel is dynamically or impact loaded in Fig. 7, by having the gear attached to the axle when the airplane is fully loaded. The fuselage and landing gear is raised different heights and moving the wheels of the gear to make conditions of the wheel load. The wheel load is a dynamic load or axle thrust. The landing gear is attached to the landing gear when the airplane makes a landing. The test still, shown in Fig. 8, is tested on a roller to the way in which the landing gear is attached to the fuselage and first used by the writer. (Fig. 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 82

The test on the leading edge of the wing, as it is performed extending forward from the front spar, is similar to that applying a load on a box beam section cut from one of the wing panels used in the wing test.

This test not only indicates the strength of the rib when fastened to the spine but it indicates the combined strength of the false rib when supported laterally by a metal or plywood cover running from the neck to the head plate. The metal or plywood cover also keeps the fabric from coming free, stepping between the ribs during flight. During the static test of any part of the airplane the deduction of the structure is measured and studied, the results of which may be used in the design of future airplanes.

The National Aero Development Club is Organized in Detroit

A CLUB called the "National Aero Development Club" with the main office at 600 Main Building, 215 Main St., Detroit, Mich., has been organized as a non-profit organization, with the purpose to promote aviation. All the officers of the club, and a good many of the charter members, served with the aviation branch of the Army during the war, and have kept up their training ever since.

[illegible]

All flying instructions will be given in the latter place held for that purpose. Ground training will be from good material obtained as a donation from the Navy. It is claimed that members of the club will be able to get actual flying time at a cost twenty per cent less than they could by flying their own planes.



Front quarter view of the Fuchs-Wald "Dutch"

The Focke-Wulf "Ente"

German Design Powered With Two 75 Hp. Siemens
Engines Flies 87 M.P.H. on First Test Flight

[illegible]

First Type Designed by Valian

The principle on which the Kato was designed was in no way different from those of the normal modern glider. The fuselage of this type, called a "Canard", was constructed in accordance with the French concept. Volsin in 1938 and 1939 was the principal of this construction. The surface of the main wing was on most of the very early type gliders that of the Wright brothers, Maritz, etc. This type is now called the canard because of the resemblance of the planing surface to that of the head and neck of a swan in flight.

At the last flight of the Focke-Wulf plane, Harry Wolf of Germany was the pilot. After leaving for about 700 ft. to give the controls a tank off. He kept it low, gathering speed in a curve, climbed it to about 800 ft., gradually so and then more steeply. At that height he attempted a turn and returned once his student could believe in



has a rotational fuselage, though the diaphragms



Boat quarter view of the "Eute"

tion of the surfaces somewhat after its shape. It is like the plywood covered fuselage used by the Focke-Wulf Co. on its standard plane. The monoplane wing, placed near the rear of the fuselage is almost identical in that on the Focke-Wulf A-34, a conventional monoplane. It has conventional type ailerons. The main difference is the wing is that at certain points the angle of incidence is changed. The wing is of wood with less spars. In front of the main wing is the horizontal stabilizer which is adjustable so that it can be turned about its longitudinal axis. This stabilizer is made in both glass and cloth with an elevator mounted at the rear by a number of large external struts. The elevator is mounted in such a manner that there is a large slot between the elevator and the stabilizer, giving a sort of aileron slot action. At the rear of the fuselage is an exceptionally large vertical fin with rudder attached. This large fin was necessary because of the unconventional disposition of load and pusher side forces set up.

Two 75 Hp Siemens Engines

The power plant consists of two Siemens 75 hp, air-cooled radial engines, each mounted on a streamlining nacelle below the wing on each side of the fuselage. The fuel tanks are mounted above each engine on the leading edge of the wing.

The engines are operated from the wing by a flow valve. The underframe consists of a wheel below each engine nacelle, while a third wheel, completing the landing gear is mounted under the forward part of the fuselage. The two main wheels at the back carry the shock absorbers and the wheel brakes. By this arrangement, with the center of gravity just over the rear of the fuselage, it is impossible to stall over. The two rear wheels are placed exceptionally far apart making it almost impossible to turn the machine over on the ground.

The center of gravity is so placed that the leading part of wing area is considerably greater than the forward horizontal surface of stabilizer. If both the surface and the main wing had similar airfoil sections it is necessary to give the forward



Horizontal stabilizer and elevator of the Focke-Wulf "Ede"

would require a larger angle of incidence in order to carry its load and produce longitudinal stability. (The same effect may be produced by a combination of different airfoils.) As the angle of attack of the entire plane is increased the forward surface stalls before the main wing causing the plane downward wing stability is upon attack. In that way there is an angle margin protecting the main wing from ever stalling during the possibility of a spin. This "margin of protection" is the angle between the incidence of the forward surface and that of the main wing. When the



A "forward" type biplane built by Focke in 1926 and 1912

forward surface is at the stalling position the main wing is at an angle less than the stalling angle by the margin protection. In order to increase the margin angle at the back of the main wing the angle between the incidence of the two horizontal surfaces will have to be diminished, increasing the longitudinal stability. Thus in order to increase its range it is necessary to sacrifice some stability.

The longitudinal stability of the forward type of plane is explained on a slightly different manner. In the design two of the center of gravity, the forward plane carries greater load and thus must have a greater lift. When an attack of the entire craft is increased, the total lift of the plane increases (increasing the speed of the plane) the plane is raised upward, the leading part of the fuselage is washed back and the lift on that area begins to fall off among the plane downward until the plane experiences a rapid recovery for the forward surface to reach equilibrium (to get to a stable). Thus, for any particular combination of airfoil sections the plane will have a definite speed in air at which it is stable. Should the engine be throttled the plane will nose downward assuming a natural angle of climb. If the throttle should be opened the plane will nose upward, naturally climbing. (The relative position of the center of gravity has been suggested.)

The conventional modern airplane attains its stability much the same manner, except that on the curved type main wing cannot reach its stalling angle, and therefore the plane cannot stall for full time a spin. But flow section over aerodynamic considerations besides that of "impulse" stability. An accelerated motion makes the air flow (the air) of the fuselage parts of the plane is more stable by "shaking" parts is more, anything that will not disturb the flow over the wing. The airflow over a wing (the air) of the main wing of the Ede is disturbed by the leading fuselage and stabilizing surfaces. On the Ede

surface it is almost necessary to have an even number of airfoil surfaces there in order to avoid engine mounted in front of the fuselage the fuselage, having an exceptionally high level.

Distribution of weight on the Ede is as follows:

POWER PLANT	
Two engines—Siemens 75 hp	620 lb
Two generators with associated gear	60 lb
Two fuel tanks (about 24 gal. each)	52.5 lb
Two tail wheels (about 125 gal. each)	132 lb
Instruments, piping, etc.	90 lb

Total	
Engine	620 lb
Generator	60 lb
Fuel tank	105 lb
Wing with struts and engine nacelles	578 lb
Horizontal tail surfaces	132 lb
Vertical tail surfaces	132 lb
Front wheel, 600 cc	35 lb
Rear wheel, 600 cc	35 lb
Rear wheel, 600 cc	35 lb

Total	
Engine	1,240 lb
Total weight empty	2,500 lb

BEMPEL-VALE LOAD	
Engine	620 lb
Generator	60 lb
Fuel tank	105 lb
Wing with struts and engine nacelles	578 lb
Horizontal tail surfaces	132 lb
Vertical tail surfaces	132 lb
Front wheel, 600 cc	35 lb
Rear wheel, 600 cc	35 lb
Rear wheel, 600 cc	35 lb

Total	
Engine	1,240 lb
Total weight empty	2,500 lb

BEMPEL-VALE LOAD	
Engine	620 lb
Generator	60 lb
Fuel tank	105 lb
Wing with struts and engine nacelles	578 lb
Horizontal tail surfaces	132 lb
Vertical tail surfaces	132 lb
Front wheel, 600 cc	35 lb
Rear wheel, 600 cc	35 lb
Rear wheel, 600 cc	35 lb

Test was recently received that Herr Wulf, was killed while testing a new type high lift wing monoplane, and it is assumed that the message is to the Ede. No further word was received other than that the plane crashed from a height of 300 ft. The cause of the crash was not stated. However, it is believed that experiment with this design will be continued.

Plan Second Air Meet

THE FIRST air meet held in South Texas Sept. 10, at which have nearly fifty planes of various types from Austin, Kelly and Elgin, both participated in maneuvers on the land field, was so successful that a second event is being planned to take place during the days of the Valley Air Meet Fair held at Harlingen from Nov. 24 to Dec. 2. Arrangements are under way for the second meet and it is expected the number of planes participating this time will be even greater. According to the report of the first meet, the local landing field seemed extraordinarily good for a landing field and it is expected to be placed on the air field near San Antonio to Mexico as soon as arrangements toward that end can be worked out.

Floating Seaplane Dock

A REPORT from Berlin states that a floating dock, for seaplanes, and to be the first of its kind in the world, is actually located at the Flensburg shipyard in Lubeck. It is stated that the dock was designed with a view to future expansion having a capacity of 500 tons, which is much larger than any floating dock in service. The dock is expected to be used in connection with a series of experiments with very large seaplanes.

Advertises Air Mail Express

NOT ONLY are San Francisco mail stores now making extensive use of the air mail in sending shipments from the coast but they are also advertising the fact to prospective customers. The J. J. Hines store arranged a display in its window in order to tell the public that they were the first San Francisco store to receive a dress shipped by air mail.



Window display of an air mail express shipment

express from New York. As will be noted in the accompanying illustration, the display included the dress, the wrapping paper in which it was mailed and a window card telling about the event. Another shipment that came by air mail was a shipment of men's hats which were displayed together with the box in which they were mailed in the store window. Both of these displays attracted a great deal of attention.

Enroll Chinese Student Pilots

FORESEEING A period of intense aeronautical development in China, William Kay and Norman Poy, full blooded Glensons, have carried for six months course in general aviation at the Marshall Flying School of Marshall, Miss. According to Mr. Poy, aviation is more or less engaged in China only because there is a lack of aeronautical knowledge, and he believes (reasonable possibilities in commercial aviation for anyone who will apply modern American knowledge to a study and thorough aeronautical knowledge with an understanding of the Chinese nation).

Both Mr. Poy and Mr. Kay are college graduates, and write and speak English fluently. They are both taking a full flying course and a full ground course and will also study aeronautical meteorology and business methods. Mr. Poy, who was born in Canton, China, is already a graduate of an engineering college, and in the Marshall Flying School is specializing on flying instruction while Mr. Kay is specializing on the mechanical or ground work of aviation. Upon completion of their courses both men will leave immediately for China where they will go into the Aviation business on a large scale.

me in aviation engines and there is no doubt but that the manufacturer was absolutely correct in his claim. However, it required less than five minutes full throttle operation of a Whirlwind engine to burn a hole completely through the head of one piston and seriously damage several other pistons. This result was of course a great surprise to the fuel manufacturer who had entirely failed to appreciate the wide difference between ordinary motor car operation and full throttle operation of a modern aviation engine.

The operator is also warned to be skeptical of claims that a given fuel will materially increase the power output of his engine. Providing the fuel is sufficiently visible to give good distribution and has sufficient octane value to avoid detonation, very little improvement in engine operation can be secured by adding a much higher grade fuel. Tests conducted in the Wright factory indicate that without changing the design of the engine, little advantage can be gained from fuels of unusually excellent quality.

Control Fuels to be Avoided

Remembering the entire situation, the operator should bear in mind that while engine damage will inevitably result from the use of fuel superior to that specified, there is very little to be gained by the use of fuel superior to that specified. The important qualities of a fuel are purity, volatility, and anti-knock value. A satisfactory fuel for Whirlwind engines will be secured if the producer meets Pennsylvania grades and tests that his fuel meets the requirements of the government specification for domestic aviation gasoline. Then and when fuel is to be used in a light engine, little can be gained if the fuel proves to be superior to good domestic aviation gasoline. On the other hand, very serious damage is apt to result if the fuel turns out to be below the standard aviation standard. He should not place too much reliance on field demonstrations as these are very apt to be misleading. A slightly different setting of the mixture control could easily offset the difference between two fuels being compared. With their conditions and the character of flying also make accurate comparisons difficult. Particular care from reliable producers who have a reputation to maintain rather than from one concerned who are trying to establish a reputation. The government test laboratories are continually searching for improved fuels and that out of the thousands tested here and abroad gasoline are the only ones that have been approved for Army and Navy use. Other things being equal, fuels from California grades are always preferred. However, in the case of the Wright Whirlwind engine, that preference does not warrant a categorical recommendation either as to avoidance or as to use. Finally, while specific gravity is the basis of the usual test distribution for fuels, this property has no direct relation to the performance of the fuel in an aircraft engine.

Specifications for domestic aviation gasoline are contained in the instruction book furnished with each Wright Whirlwind engine. These specifications agree in general with those set by the Army, the Navy, and the Bureau of Mines. Reliable tests to determine the compliance of any sample of gasoline with these specifications can be made at reasonable cost by any responsible, competent consulting chemist or petroleum technologist, who can also readily determine the source of the crude from which the gasoline was distilled and thereby appraise its anti-knock value for present purposes.

Fuel Supply Stations Marked

IN A report to the Aeronautics Branch of the Department of Commerce, the Standard Oil Co. of Indiana states that most of its fuel supply stations in ten states have markings on the roof for the guidance of aircraft. The purpose of the company, it is stated, is marking of 4,000 stations, most of which will be marked with aviation fuel and oil. Generally no error or confusion direction has been noted in these signs but the top of the letters has been curved. Reading the sign from the north, the pilot knows that the opposite side of the sign is north.

Canadian Ship to Shore Plane Experiments Prove Successful

AN EXPERIMENT was recently successfully carried out in Canada with a steamship and airplane combination for the saving of time for incoming and outgoing mails. The air mail service is to link up many of the principal Eastern Canadian cities with British and ships. The service is not to end more than five days from the time required by regular train routes. Covering more than 1,000 flying miles, the Canadian planes brought English mail from ships to the St. Lawrence River to inland points, where timely delivery means mail went forty-eight hours after the mails had docked.

Outgoing mail left Montreal by a Canadian Airways airplane at noon and in a little more than three hours arrived at Rimouski, Quebec, a distance of 300 flying miles, where the mail was placed aboard the Empress of Scotland, bound for Europe.

Meeting the SS. Newel Royal before it had docked at Rimouski, British mail was put aboard a plane and within three hours the plane dropped the cargo at Quebec.

At Quebec the Rimouski plane was met by another machine which picked up the incoming steamer mail for Ottawa, making the capital 48 hours ahead of the regular train schedule. Continuing on its journey, the plane from Rimouski is loaded with mail from Montreal, Toronto and Winnipeg, all mail for these cities arrived and was distributed that afternoon.

Haskelite on Winning Planes

AT THE National Air Races held at Spokane, Wash., a September, Haskelite continued its high average of use in prize-winning planes demonstrated last year. The government, in the Ford Reliability Air Tour in July, in Colonel Lindbergh's and other record-breaking flights.

The Haskelite company states that in the air display race from New York to Spokane and from San Francisco to Spokane, 34 of the 41 planes which received prize money were equipped with Haskelite. Every first prize winner was a Haskelite-built plane.

Thirty-one of the forty-five prize winners in the tenth National Air Races held at Spokane were planes having important parts of Haskelite. All of the first-prize winners in the speed race were Haskelite-equipped, and one of the twelve event plane built with this blood-grease played made a nice sweep of the prize money.

A Training Plane Height Record

ACCORDING TO a Michigan report, Lieut. Henry T. Ogden, mechanic on one of the Army tested the world plane and now a member of the 107th Observation Squadron, Michigan National Guard established a record for climb with a Consolidated PT-3 training plane during a flight on Oct. 22, when he reached an altitude of 15,150 ft. He was accompanied by John T. Merrill.

The flight was made on an unusually clear day and most of the climb was made over the city of Detroit but at 10,000 ft. the firm climbed the cloud and continued their flight into Canada although they headed the plane into wind with an air speed of about 70 m.p.h. They reported that Lake Huron, Lake Erie and Lake Erie were visible and views from Port Huron to Cleveland and west to Detroit.

Most were visible also.



Side view of the Ryan Brougham (Wright Whirlwind)

Ryan Brougham Monoplane

A Sister Plane of the "Spirit of St. Louis" and is Powered With a Wright Whirlwind Engine

THE ACTIVITIES of the B. F. Mahoney Aircraft Corp., founder of the Ryan Brothers, Inc., builder of the "Spirit of St. Louis" have been the object of considerable attention since Col. Charles A. Lindbergh's transatlantic flight. The company is now producing in a production house the Ryan Brougham or Ryan B-3, a five-place monoplane powered by a Wright Whirlwind engine.



Front view of the Ryan Brougham, manufactured by the B. F. Mahoney Aircraft Corp.

The Brougham is streamlined to give the best aerodynamic shape consistent with the manufacturing process available. An section of the fuselage, through the longitudinal axis will give a streamlined section. The plane is very stable in flight (not maneuvered). A wide range of vibration adjustment (nose droop) is provided which permits the plane to fly smoothly with tail fixed or pilot choice. The 50 inch consists of a pilot and four passengers with four or five seats in addition to sufficient fuel for a cruising day of 700 mi. Weighing 3,100 lb. loaded the B-3 has a

high speed of 120 m.p.h. with a landing speed of 40 m.p.h.

Inside the wing is the passenger's cabin with the pilot's cockpit at the front under the leading edge. Behind the passenger seats is a compartment large enough to accommodate four or five suit cases. The cabin is heavily upholstered with blue velvet and over a packing of Tolson Wool. This packing cushions engine and propeller action besides acting as an excellent insulation against extreme temperatures outside. The sides and front of the cabin are fitted with glass windows giving good vision forward, to the sides and downward. The side windows slide either fore or aft to be opened, while the windows at the side of the pilot's seat are adjustable up and down for landing in bad weather. At each side of the cabin is a door providing easy entrance or exit. Safety belts are standard equipment. The cockpit is fitted with conventional stick and pedal controls with the rudder pedals and instruments conveniently grouped in front of the pilot. All instruments are actuated by 1/4 in. dia. 7 by 10 threaded aviation cable forward and are connected to control bars through master cables. Foot pedals are provided for brake mechanism to allow combination of brake control cables if desired.

The fuselage is of welded steel, rubber members built into the sides and front of the cabin are fitted with glass windows giving good vision forward, to the sides and downward. The side windows slide either fore or aft to be opened, while the windows at the side of the pilot's seat are adjustable up and down for landing in bad weather. At each side of the cabin is a door providing easy entrance or exit. Safety belts are standard equipment. The cockpit is fitted with conventional stick and pedal controls with the rudder pedals and instruments conveniently grouped in front of the pilot. All instruments are actuated by 1/4 in. dia. 7 by 10 threaded aviation cable forward and are connected to control bars through master cables. Foot pedals are provided for brake mechanism to allow combination of brake control cables if desired.

a Warren tube. The members are joined with butt welds, all joints being made with a 30-deg scarf angle. The engine is mounted on a conventional cantilever welded steel tube frame, the joints in the fuselage structure by four bolts. Behind the engine and in front of a support bracket is a 0.5 gal. copper oil tank. It is mounted inside the casing



Showing welded engine construction on the Ryan Brighman. Here is added to engine spar

where the engine mount. The two main fuel tanks of 40 1/2 gal. each are mounted in the wing.

The wing is built in one continuous panel attached to the fuselage at the upper longerons with a steel fitting. The wing is also braced by two external tubular supports on each side of the fuselage. These "left" struts are of 1000 steel tubing struttled with bolts need to have an airtight seal. By means of an adjustment with a positive locking device at the upper ends the wings can be quickly skewed. The forward tube is 3 1/2 in. dia. and the rear tube is 2 in. dia.

The structure of the wing is manufactured with 1 section upper built up of three concentric tubes of square, round, and long used throughout. The ribs are of the same type, all ribs and top strips have 1/8 in. thickness of aluminum plate at the joints. Drag bracing is by a single system of steel wire net lamination, with the main fittings of 1000 steel sheet having 1/8 in. thickness to reduce the bearing stress to 36,000 lb. per sq. in. The aluminum of welded 1000 steel tubing mounted and welded all on water taps to permit intervisibility. The internal structure is protected



Showing the method of supporting the fuel tank on the Ryan Brighman.

both inside and out against corrosion. The internal structure is on a hollow pan with an aluminum connection, or grouting.

In the wing are two horizontal fuel tanks internally prepared against corrosion. Provision is also made such as the passing of drag wires through the tanks.

The tail surfaces are similar in structure to the wings, being of welded 1000 steel tubing protected both inside and out against corrosion. The control surfaces are aluminum, as has been mentioned before, the 1000 steel tubing can be adjusted through nine degrees. These surfaces are also built in a water tap making them intervisibility. The landing gear has an exceptionally wide track and is mounted on the wing left struts with supporting struts leading to the upper and lower longerons. Thus the landing gear may be tilted the right side type with each side dependent of the other. A trackless type of rubber shoe assembly is used with the main members, which are of the multiphase steel tubing, provided at the upper end of the wing left struts, and in addition, are braced to the fuselage. The axle is of heat treated steel tubing and is equipped with



Trailing the engine mount on the Ryan Brighman. Engine was attached to the fuselage by four bolts

brings necessary for the installation of brakes if desired, thus making the other. The outside tube is the all steel proper while the inside one, or the attachment tube, is provided at the top to allow the tail disk to swing about.

Vertical loads are taken by vertical shock struts which drive the disk to slide up and down on the main tube. But when in landing are resisted by a set of horizontal shock struts allow the disk, as it pivots on its upper bearing, to move backwards against the pull of the rubber. The steel wires is resisted by the vertical struts. The fitting on the side of the fuselage can be quickly opened by the use of hookless fasteners for inspection of the tail disk and its adjustment.

The general specifications and performance figures for the Ryan Brighman, as supplied by the manufacturer are as follows:

Span, 30 ft. 0 in.
Length, overall, 37 ft. 0 in.



Side view drawing of the Ryan Brighman

Height (to tail)	9 ft. 10 in.
Area of airfoil	22 sq. ft.
Area of fuselage	15.6 sq. ft.
Area of wing	9.0 sq. ft.
Area of fin	2.5 sq. ft.
Area of wing, including ailerons	28.0 sq. ft.
Wing volume	1.0 cu. ft.
Angle of incidence	4 deg.
Max. weight of fuselage	2,000 lb.
Max. weight of fuselage	2,000 lb.
Propeller diameter	30 in.
Gearbox capacity	50 gal.
Oil capacity	22 gal.
Weight empty	1,400 lb.
Max. load	3,000 lb.
Total useful load	1,600 lb.
Maximum speed	120 m.p.h.
Maximum speed (full load)	40 m.p.h.
Climb with full load, still air	900-1200 ft. per min.
Service ceiling	10,000 ft.
Take-off (full load, still air)	600-800 ft.

Air Mail Stops in Ohio

THE POST Office Department has designated, according to a report by the Department of Commerce, a number of air mail stops in the state of Ohio as the Louisville-Cleveland route, a preliminary survey of which is nearing completion. These are: Wright Airport, Cleveland, Cincinnati, Columbus, Dayton and Louisville. Great interest is said to have been shown in various towns along the airway. Many of these are said to be already negotiating for fields to be turned over to the Government for \$1 a year.

Aircraft Export Figures for the First Six Months of 1927

EXPORTS OF aircraft parts, except tires, from the United States, during the first six months of 1927, are as follows:

Country	Value
Canada	\$81,731
Great Britain	30,580
France	54,876
United Kingdom	30,654
China	8,778
Dominican Republic	2,800
Hawaii	4,669
Brazil	1,660
Argentina	1,479
Germany	1,209
Japan and Manchuria	1,040
Italy	908
Prussia	845
Sweden	580
Philippine Islands	427
Australia	406
Other British West Indies	332
Colombia	318
Other Dutch East Indies	75
Czechoslovakia	59

Total value of aircraft parts, except tires, for the first six months of 1927, \$319,276

Country	Value
Canada	\$24,345
Great Britain	28,183
France	21,625
United Kingdom	10,980
China	10,680
Argentina	5,008
Czechoslovakia	4,209
Poland & Denmark	4,180
Spain	3,790
British South Africa	790
British West Indies	440
Australia	20

Total value of aircraft parts, except tires, for the first six months of 1927, \$112,082

Exports of airplanes, airplanes and other aircraft for the first six months of 1927, are as follows:

Country	Value
Canada	\$187,080
China	5,845
France	20,680
Japan	21,625
Germany	10,980
Brazil	8,003
Argentina	3,481
Australia	750
Spain	15
Netherlands	15

Total value of aircraft parts, except tires, for the first six months of 1927, \$112,082

Correction

ON PAGE 941 of the Oct. 17 issue of AVIATION it was stated as error that E. A. Johnson was president of the Boeing Airplane Co. It should have been that Mr. Johnson is president of Johnson Airplane & Supply Co., of Dayton, O.



© Pacific Air Transport

And Nitro-Valspar is making history

FIVE of the Pacific Air Transport planes—three Ryans, one Bonanza and one Swallow—are protected with Nitro Valspar, concerning which that company's Super Incident says:

"I like Nitro-Valspar because we can dope right over it. It is very quick to dry and once a ship is finished with Nitro Valspar the finish remains for an indefinite period."

Men who are in the best possible position to judge a finish—under the hardest of service conditions month in and month out—like one which without ribbon needs the puff.

That's reason enough for choosing Nitro Valspar.

NITRO-VALSPAR

The Valentine all-lacquer finish

Valspar thrives on Weather —good or bad

WINDS beat, sun scorches, storms rage, fogs attack; but Valspar has survived thousands of battles with the elements—and always comes through smiling.

That's why Valspar is the most widely used airplane finish today, —and has been since the earliest days of flying.

That's why Valspar is used on the planes of the Pacific Air Transport which fly one of the longest and most trying air mail routes in the world: from Los Angeles to Seattle.

That's why Valspar and Nitro-Valspar were used to protect the Ryan monoplaner "Spirit of St. Louis" on its never-to-be-forgotten trans-oceanic flight.

At left—Pacific Air Transport pilot about to take off from Los Angeles at midnight in his Nitro-Valspar plane for a 14-hour trip to Seattle

VALENTINE'S
VALSPAR



© Pacific Air Transport

VALENTINE & COMPANY

456 Fourth Ave., New York, N. Y.

Chicago Boston Detroit

W. F. Toller & Co., Pacific Coast



*That's why
More Pilots fly them!*

The extensive use of the Ryan Bonanza on mail routes on the Pacific Coast has demonstrated it to be a worthy companion of its airmanship "The Spirit of St. Louis".

The remarkable performance of this plane is built upon sound engineering design plus excellent construction—and the installation of Wright Whirlwind Engines. Deeply cushioned chair, heavily insulated cabin, easy of access with splendid ventilation, together with

excellent vision all combine to provide convenience and comfort for both passenger and pilot that is unusual. The durability, reliability and safety of Wright Whirlwind Engines in private flying is proverbial. Their splendid performance on the many overseas flights and an over 4,635,000 miles of military and commercial flying during 1926 confirms the fact that experienced fliers and aerial commercial operators have in this Superlative Engine.

Send for Bulletin No. 17 R.

WRIGHT AERONAUTICAL CORPORATION, Dayton, N. J., U. S. A.

WRIGHT
Whirlwind
engine
A SUPERLATIVE AERONAUTICAL
©



The World's Premier Fabric



Colonel Lindbergh while flying toward Paris drove his plane through a heavy storm of wind, rain, and sleet for ten hours. On inspection of the plane in Paris it was found to be in excellent condition. It was protected by Flightex Fabric and Tape.

A NOTE TO:

Aircraft Designers
Aircraft Constructors
Aircraft Operators

Your plane when covered with Flightex has an added distinction of quality.

D. F. MAHONEY AIRCRAFT CORP.



MAINT 11, 1927.

S. S. Twining & Co.
New York City

MEMORANDUM FOR MR. S. S. TWINING

RE: MAINT 11

On receiving MAINT 11, the last morning, I was informed that the plane, MAINT 11, was in the hands of the "Spirit of St. Louis" and that it was to be covered with Flightex fabric and tape.

As you are producing the Flightex material, I am sure that you will be able to supply the material in the quantity and quality required.

As you will be able to supply the material in the quantity and quality required, I am sure that you will be able to supply the material in the quantity and quality required.

Very truly yours,
S. S. Twining & Co.,
New York City

MAINT 11



PIONEER INSTRUMENTS

... guided Lindbergh to Paris in that most famous of all Ryans, the "Spirit of St. Louis". Pioneer Instruments are used wherever quality and performance are demanded. Lindbergh said of his Pioneer Instruments:

Lindbergh has made a great deal of

... that I could without a nerve
... and without the ordinary work
... navigating instruments, but my
... Director was my north indicator
... there.

I also had a magnetic compass, but
... was the Pioneer compass, which
... did me as accurately as I like. I
... can count only three miles from the
... north point that I might have hit.
... I had had a navigator.

I replaced a magnetic compass with a
... magnetic compass. This compass

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PIONEER INSTRUMENT COMPANY

754 Lexington Avenue, Brooklyn, New York

122 So. San Pedro Street, Los Angeles.
51 Boulevard St. Michel, Paris.

15 Spaul Street, San Francisco.
Simpson & Johnson, Boston.

General European Representative,
M. Calderara, 11 bis Rue Montagne, Paris, France.

E. S. TWINING & COMPANY

320 Broadway, New York, N. Y.

Cable Address: Flightex

Code: ARC RA Edt 11



Standard Steel Propellers are used on Mahoney Planes



Four place Ryan Brougham recently delivered to the U. S. Department of Commerce

STANDARD Steel Adjustable Pitch Propellers have been used on Ryan airplanes, which are now manufactured by the B. F. Mahoney Aircraft Corporation, for years.

The most famous of all Ryan planes, The Spirit of St. Louis, in which Colonel Lindbergh made his great flight from New York to Paris is equipped with a Standard Steel. In almost all of the many splendid flights of the past year, Standard Steel Propellers have played an important part. In every



case they have functioned perfectly and have proven that they are truly designed to give maximum performance under the most varied flying conditions. Increased performance

and reliability, better resistance to climatic changes and to the effects of rain, hail and salt spray are some of the reasons for the increasing use of Standard Steel Propellers on commercial and military planes.

There are many other reasons which will readily be sent on request.

STANDARD STEEL PROPELLER COMPANY

General Offices and Works, West Homestead, Pa.



The Ryan Brougham, an adaptation of Lindbergh's 'Spirit of St. Louis', which was HASKELITE for wing and cabin construction.



"As formerly, practically all plywood used in Ryan Planes is HASKELITE"



HIS statement is from a recent letter of the B. F. Mahoney Aircraft Corporation, manufacturers of the Ryan Brougham and other planes. HASKELITE is used in both wing and cabin construction in the Brougham. It has been applied consistently in the planes turned out by this builder in recent years including the one in which Colonel Lindbergh made his trans-Atlantic hop.

This company is not unique in its preference for HASKELITE. Over 90% of the plywood used in aircraft construction is HASKELITE. It has more than 30 applications. The list includes such structural members as wing ribs, box beams, end and tail ribs, besides uses like leading edges, aileron surfaces, and bulkheads.

HASKELITE versatility and dependability merit your investigation. Information on request.



HASKELITE MANUFACTURING CORPORATION
133 W. Washington Street
Chicago, Ill.



Sisterships

The Spirit of St. Louis and the RYAN BROUGHAM — Five-Place!

This new five-place Ryan Brougham... developed from the famous plane designed and built for Colonel Lindbergh... reflects in quality and workmanship a concentration on a single type and model. It is thoroughly engineered, tested and

Luxurious appointments.
Discontinued.
 Wright Field Equipped,
 \$9,750 San Diego.



proven. The interior, completely upholstered in mohair, has ample room, comfortable seats, perfect visibility, and is easy of access. Ownership of a Ryan Brougham assures you of the utmost in a modern airplane.

The B. F. MAHONEY AIRCRAFT CORPORATION, San Diego

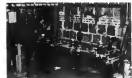




SUMMERILL Seamless Steel Tubing

*is used throughout the
fuselage, landing carriage
and tail structure of the*

RYAN BROUGHAM



Welding the tail structure for the Ryan Brougham in the factory of the B. F. Mahoney Aircraft Corporation. Specification 1025 steel tubing supplied by the Summerill Tubing Company.

**SUMMERILL
TUBING COMPANY**
BRIDGEPORT, PENNSYLVANIA

*Specialists in Aircraft Tubing
Manufacturers for 25 years.*

Formulated to Specifications in
**STRAIGHT CARBON
NICKEL STEEL
CHROME MOLYBDENUM**

"The Secret of Airplane Efficiency..."

... lies in the rib straight grain Spruce, J. V. G. Posey & Co., Portland, Oregon, furnished. The best possible material obtainable is used throughout the Ryan Brougham manufactured by the B. F. Mahoney Aircraft Corporation.

Quotation from a statement made by the B. F. Mahoney Aircraft Corporation.

Spruce supplied by Posey was used in the most famous of all Ryan planes, "The Spirit of St. Louis"



Building the wing ribs of a Ryan Brougham from spruce supplied by J. V. G. Posey and Company.

AIRPLANE SPRUCE

*Rough Green, Rough Air Dried, Kiln
Dried Rough, or Finished to Size.*

J. V. G. POSEY & COMPANY
Public Service Building
Portland, Oregon

SPRUCE SPECIALISTS FOR OVER 20 YEARS

We, Too, Are Expanding!

The expansion of the B. F. Mahoney Aircraft Corporation has its part in our own expansion. Their increased purchases have helped make new facilities necessary. We appreciate their business and congratulate them on their success.

To the B. F. Mahoney Aircraft Corporation, and to other major customers, including Travel Air, Hamilton, Waco, Cessna, American Eagle, Pietenzo and many others, we are selling engines, instruments, wiring, lights, steel tubing and wire, fabric, rivets, washers, clamps, clamps, and, magnets, airplane spacers and thousands of other items. Our \$1,000,000.00 worth of supplies shows the last eight months of 1927.

Write now for a FREE copy of our new 100 page illustrated catalog which will be of the price in about two weeks.

**NICHOLAS-BEAZLEY
AIRPLANE CO., INC.**

"We'll Be Here Tomorrow"

264 North St. Marshall, Minn.



The new Nicholas-Beazley Airplane Co. Inc. building at Marshall, Minn.

IN EVERY BROUGHAM
*- there is a "fineness inherent", a "personality",
unusual in production airplanes...*

Confidence in a plane is psychological.

One of the first impressions you will have while riding in the Brougham is a sense of quietness — smoothness — comfort. A thick lining of BALSAM WOOL between fabric and upholstery muffling engine and propeller noises contributes greatly to this inherent feeling of security.

"Balsam Wool"

The efficient insulation against heat, cold and sound.

Wood Conversion Company

INSULATING AND SOUND DEADENING MATERIAL
CLOQUET, MINNESOTA

The Elgin Unit Control Board



THE ELGIN type TA unit control board contains the Elgin chronometer tachometer, Army type C altimeter, oil pressure gauge, oil temperature gauge, Elgin thirty hour clock, and anemometer for air-cooled engines. This type of board is also furnished for water-cooled engines with the anemometer replaced by a water temperature gauge. The weight of the board, with five feet of auxiliary tubing for the oil temperature gauge is only five pounds and ten ounces.

The board is directly lighted with a two-standpipe Mazda lamp, for use at dusk, or for the time that a plane is being warmed up on a brightly lighted field, and other times when it is not dark enough for the luminous substances on the instruments to give a good reading.

This type has recently been installed on a Mahoney Brougham with very satisfactory results, and is now being used on several of the leading commercial planes. The Elgin National Watch Company also makes two different indirectly lighted unit control boards. The entire level of the board is chromium plated to insure uniform luminosity of the board.

ELGIN NATIONAL WATCH COMPANY
35 East Wacker Drive, Chicago, Ill.

Factories, Elgin, Illinois



An aero-cloth that exceeds the most rigid government specifications . . .



THE quality of Dartmouth-Tex aero-cloth and tapes has been proven to exceed the most rigid government specifications. This is one of the factors which has made it the leading grade "A" aero-cloth in America. Dartmouth-Tex has played an important part in military and commercial aviation since the days before the World War.

Dartmouth-Tex is a mercerized cotton, full count fabric, 36 inches wide, for wings and surfaces, fuselage coverings. It can be obtained on convenient rolls, which insure against creasing and wrinkling. It is supplied either processed or unprocessed.

Durable tapes of all kinds—surface tapes, glinks, (scalops)—in any size required are ready for immediate delivery. Write for samples and quotations.

Sole Distributor

W. HARRIS THURSTON
THURSTON CUTTING CORPORATION
116-118 FRANKLIN STREET
NEW YORK CITY

THE LEADING GRADE "A" AERO CLOTH

Read this letter from B. F. Mahoney Aircraft Corp.



CAMPBELL NIBBLING MACHINE

ANDREW C. CAMPBELL, Inc., Bridgeport, Connecticut



This No. 3-A Machine has a 18-inch throat and handles material up to 3-10" thick, with a cutting speed of approximately 30 inches per minute. Campbell Nibbling Machines are made in the following sizes:

Model	Throat Capacity	Depth of Throat
1	3-10"	8"
2	3-10"	12"
3	3-10"	18"
4	3-10"	24"
5	3-10"	30"

Write for Full Catalog and Prices

HAMILTON PROPELLERS



HAMILTON PROPELLERS SELECTED FOR NEW RYAN BROUGHAM

The confidence shown by the R. F. Mahoney Aircraft Corporation, manufacturers of the Ryan Brougham, in selecting Hamilton Propellers, again bears out what other aircraft manufacturers have so often said — that "Hamilton Propellers are the best made". Hamilton Propellers are designed and constructed to give the greatest efficiency under all flying conditions.

HAMILTON AERO MFG. CO.
80 Keefe Ave. Milwaukee, Wis.



Service Steel

Seamless Tubing

is called for by
the engineers'
specifications
on the Ryan
B-1

Seamless steel tubing for aircraft
purposes, in all grades, can be
supplied from both warehouse
and mill. Immediate shipments
made in any quantity.

SERVICE STEEL CO.
1435 Franklin Street, Detroit, Mich.



Equipped with Gruss Aero Strut Shock Absorbers



Ryan Brougham

Always in the AIR Yet on the GROUND



A 10 inch compressed air cushioned
range of deflection absorbs all land-
ing shock and also eliminates all jar
when taking.

A positive hydraulic check govern-
ing recoil. These features make all
landing soft and short and insure
protection to all parts of the ship.

**Safety, Economy and
Efficiency**

Manufactured by

**Gruss Air Spring
Co. of America**

(Patented)
San Francisco, California

Full information upon request

Manufacturers of the World Famous Gruss Air Spring for
Automotive Equipment, Buses, Trucks and Heavy Cars



BOYCE MOTO METER



The MOTO METER CO., Inc.
4 Wilbur Avenue, Long Island City, N. Y.
Chicago Office 420 Taylor Street

IDEAL HOSE CLAMPS



have been successfully
used on all trans oceanic
flights because they are
absolutely dependable.

Do you carry them?

IDEAL CLAMP MFG. CO.
Incorporated

260 Bradford St., Brooklyn, N. Y.

J. W. WOOD

Shock Absorber Cord

is standard equipment on the famous

Mahoney Monoplanes

The leading commercial and military planes of
today are equipped with J. W. Wood Shock
Absorber Cord. The Wood Elastic Web Com-
pany were the pioneer manufacturers of shock
cord in the United States and were the prin-
cipal producers of this product for the U. S.
and Canadian governments during the World
War. The Stoughton (Mass.) factory is fully
equipped to meet the largest requirements and
very experimental tests.

J. W. Wood Elastic Web Co.

Stoughton, Mass., U. S. A.
New York Office: 41 E. 17th St.
Canada: 12 St. Peter St., Montreal

For Perfect Control

Eliminate
in
Strength



SAUZEDDE

WHEEL AND BRAKE UNITS
used by Mahoney and other
LEADING BUILDERS

Prices and Specifications Furnished on Request

SAUZEDDE CORPORATION
DETROIT, MICH., U.S.A.

Rules and Regulations of the London Aeroplane Club

IN ORDER that these persons desirous of forming flying clubs, in this country may better understand the details involved, a printed reproduction of the circular, application and by-laws of the London Aeroplane Club, is given below.

THE LONDON AEROPLANE CLUB

The Royal Aero Club has been advised by the Air Council to carry out the London Aeroplane Club, Circular No. 1440, Aeroplane Clubs. To meet this situation, the Royal Aero Club has formed the London Aeroplane Club.

OBJECTS OF THE CLUB

1. The Club is formed with the object of bringing together as many of the Club members interested in flying and the progress of aviation and disseminating information to the general public of the progress of the Club.

CONSTITUTION

2. The London Aeroplane Club is the property of London Aero Club Limited, a company limited by guarantee, and the members of the Club are the shareholders and the Company shall be under the control of the members of the Club.

3. The only duties of Members in respect of the Company are to pay the subscription and to attend the meetings of the Club.

4. The London Aeroplane Club shall be governed by a Committee elected by the members of the Club.

5. A Member, by paying his subscription, shall be entitled to the use of the Club's facilities and to the use of the Club's facilities and to the use of the Club's facilities.

MEMBERSHIP

6. The Club shall consist of Ordinary and Associate Members and shall be open to both.

ENTRANCE FEE AND SUBSCRIPTIONS

7. A Member's subscription shall be payable in advance and shall be payable in advance and shall be payable in advance and shall be payable in advance.

8. A Member's subscription shall be payable in advance and shall be payable in advance and shall be payable in advance and shall be payable in advance.

RESIGNATIONS

9. Any Member wishing to resign his Membership of the Club shall give notice in writing to the Secretary or to the Club's Secretary or to the Club's Secretary or to the Club's Secretary.

RESIGNATION AND EXCLUSION

10. If any Member shall be found to be in breach of the Club's Rules, the Committee shall have the right to exclude him from the Club and to exclude him from the Club.

CHARGES FOR FLIGHT

11. The charges for flight shall be payable in advance and shall be payable in advance and shall be payable in advance and shall be payable in advance.

12. The charges for flight shall be payable in advance and shall be payable in advance and shall be payable in advance and shall be payable in advance.

13. The charges for flight shall be payable in advance and shall be payable in advance and shall be payable in advance and shall be payable in advance.

LIABILITY

14. The Company accepts no responsibility for damage to the aircraft, and shall be liable for damage to the aircraft, and shall be liable for damage to the aircraft.

to members of the Club, neither to control, wholly, or in part, to a very large extent, the Club's Rules.

15. The Club's Rules shall be subject to the approval of the members of the Club, and the Club's Rules shall be subject to the approval of the members of the Club.

16. The Club's Rules shall be subject to the approval of the members of the Club, and the Club's Rules shall be subject to the approval of the members of the Club.

MEMBERSHIP BADGES

17. Upon payment of the entrance fee, the Club shall be entitled to the use of the Club's facilities and to the use of the Club's facilities.

18. The Club's Rules shall be subject to the approval of the members of the Club, and the Club's Rules shall be subject to the approval of the members of the Club.

19. The Club's Rules shall be subject to the approval of the members of the Club, and the Club's Rules shall be subject to the approval of the members of the Club.

REGULATIONS FOR FLYING

20. Members shall observe themselves and shall be responsible for the Club's Rules and shall be responsible for the Club's Rules.

21. The Club's Rules shall be subject to the approval of the members of the Club, and the Club's Rules shall be subject to the approval of the members of the Club.

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GENERAL

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HIRING OF AEROPLANES

32. The Club's Rules shall be subject to the approval of the members of the Club, and the Club's Rules shall be subject to the approval of the members of the Club.

which may be made in any Member of the London Aeroplane Club which may be made in any Member of the London Aeroplane Club.

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For purposes of maintenance or to remove the pilot. The control shafts and steering column are arranged so that the stick can be moved to a middle position and the pilot at there if it is not desired to use the additional stick arrangement. As the fuselage is not widened, vision is the same as before. The cockpit, if desired, can be provided with a glass top with sliding windows at the sides.

The landing gear is arranged so as to form a perfect streamline in straight lines from the fuselage between the



Line up of Fokker Universals ready to be delivered to purchasers.

engine and over the front of the engine, thus allowing ready interchangeability of propellers.

The exhaust manifold is now purely streamlined into the wing, lying practically exactly within the wing line, and yet sufficiently raised on both sides of the pipe. Owing to the additional curvature of the side of the fuselage, due to the wing, the elevator control lever and the pylons, which were previously outside the fuselage, are now inside. According to the manufacturer the result has been an increase in speed of, so far as can be judged at the present time, about eight m.p.h. The Jones Corp. of California, distributor for Fokker Universals for this state and Arizona, recently reported that the Universal purchased by the Pacific Air Transport, Inc. has been on the Los Angeles-Salt Lake route since last June and has given very satisfactory service.

Production of Fokker Aircrafts For Commercial Use Increasing

PRODUCTION of Fokker aircrafts, for commercial use, at the Alhambra Aircraft Corp., Hawthorne Heights, N. J. has been increasing of late according to officials of that company. There have been many purchases of Fokker Universals during special equipment. The Fokker Aircraft Corp. recently purchased a special Universal fitting with the following features: The aircraft has the additional load of the plane spending apparatus. Other Universals were recently purchased by the Pacific Air Transport, Inc. by the Tels Railroad Co., a subsidiary of the United Fruit Co. to operate in Honduras, by the Reynolds Aircraft, Inc. and by Wilson H. Reynolds, Jr. of New York, N.Y. The plane purchased by Mr. Reynolds was fitted with a Pratt & Whitney "Wasp" engine having a high speed of 160 m.p.h. and a climb of 1000 ft. in the first minute.

Many Installation Changes Made

There have been many interesting changes in the installation on the latest models of the Fokker Universals. The planes are of standard Fokker construction with welded steel fuselage and vane-covered semi-circular wings built in one piece. The plane's cockpit has been redesigned to accommodate the pilot's view of the wings and the fuselage. The fuselage is made from the passenger's cabin and the pilot is seated another person one seat and at the right. A part of the seat folds away when using the controls. The controls are not sufficiently over to one side to be comfortable for the pilot to operate and yet have the wheel turn sufficiently much the wheel pedals and stick

To Open Air Mail Bids Dec. 28

POSTMASTER GENERAL New has announced that on

Dec. 28, 1937, bids will be opened at the Post Office Department for the operation of a contract air mail route between Salt Lake City, Utah, and Great Falls, Mont., via Portland, Idaho, Boise and Helena, Mont. The distance between the two cities is 476 mi. and flying will be done in daylight. The proposed schedule is as follows: (Mountain Time)

Le. Salt Lake City 10:00 A.M.	Ar. Portland 11:45 A.M.
Le. Portland 11:50 A.M.	Ar. Boise 1:10 P.M.
Le. Boise 1:20 P.M.	Ar. Helena 2:45 P.M.
Le. Helena 2:50 P.M.	Ar. Great Falls 3:05 P.M.
Le. Great Falls 3:10 P.M.	Ar. Helena 3:25 P.M.
Le. Helena 3:30 P.M.	Ar. Boise 4:45 P.M.
Le. Boise 4:50 P.M.	Ar. Portland 6:05 P.M.
Le. Portland 6:10 P.M.	Ar. Salt Lake City 7:30 P.M.

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Large Transport Plane Under Construction at Boeing Plant

THREE IS now under construction at the factory of the Boeing Airplane Co. at Seattle, Wash., what will be one of the largest commercial air transport planes ever built in this country. It is a sleek metal airplane, powered with three Pratt & Whitney Wasp engines and accommodating twelve passengers in addition to carrying 3,500 lb. of mail, baggage or freight. It is estimated to have a high speed of 138 m.p.h. and a cruising speed of 106 m.p.h. Sufficient fuel will be carried for six hours flying, giving a range of approximately 600 mi. The plane has been designed to have a considerable performance of two engines, having a high speed of 137 m.p.h. and a climb of 570 f.p.m.

The wings of the Boeing No. 80 commercial airplane will be of conventional wood and wire construction, having been swayed wide drag brackets with interplane bracing of aluminum struts and struts. The upper wing will have a slightly larger span, being 30 ft. from tip to tip, and the lower wing 25 ft. 8 in.

A Wall Upholstered Cabin

The fuselage will also be of conventional design of steel and duralumin tubing with steel tie rods for diagonal bracing. Ribs like the wings will be covered with fabric. The cabin for the passengers will be well upholstered with a single row of seats on the left side and a double row on the right. The side of the cabin will be upholstered by the fuselage structure, and will have large windows of safety glass that can be easily opened. The cabin is to be isolated against the noise of the engines and extreme temperatures. In addition, a forced ventilation and heating system is provided. At the rear of the cabin is a small washroom. The passenger compartment is approximately 7 ft. high, 5 ft. wide and 14 ft. long.

Two baggage compartments are provided, each 60 cu. ft. capacity, one in part forward of the main cabin and the other just aft. The empennage is of steel and duralumin tubing covered with fabric. Both the stabilizer and vertical fin are adjustable in flight to compensate for differences in loading or in speed in the climb and the cruise. The starters and the fuel of the wing engines. The power plant of three Wasp engines will be arranged with two outboard engines and one engine at the nose. Each engine will be equipped with an electric inertia starter and will have a hand crank in the event of failure of the electrical unit. All the engine controls are operated from the pilot's cockpit. All the tanks and all other installations are arranged so that the entire unit may be quickly removed and replaced by a smaller unit. Each engine is provided with a temperature control device operated from the cockpit.

Fuel Tanks in Wings

The fuel supply is to be carried in two tanks of 129 gal. each in the wings. It is planned that the main of the fuselage aft of an engine pump, the gasoline will be fed by gravity. (One main engine will not feed by gravity on a climb, as will the outboard engines.) The fuel supply is planned to give a cruising range of six hours at 206 m.p.h.

The cockpit is to be arranged at single control, the seat adjustable (the pilot being for the moment). The cockpit is arranged so that it can be readily covered over, making it into a closed cabin. This transport is to be provided with close drag shorteners, wheel brakes, wheel tail skid and complete night flying equipment including two parachute flares.

The following specifications and characteristics have been

Keep Date by Air



Left to right Frank Cummings, Jr., Jack Lane and E. T. Robinson, Jr., in front of the McKinney plane which Lane piloted from San Diego to Colorado Springs at 100 m.p.h. The passengers might keep an important business meeting out of the night journey now made over the Rockies.

estimated and submitted to Aviation by the manufacturer: Total weight, including 3,500 lb. per pay load, 33,770 lb. Wing area, 2,200 sq. ft. Power loading, 12.3 lb. per sq. ft. Span, upper wing 40 ft. 0 in., lower wing 30 ft. 0 in. Span, lower wing 30 ft. 0 in. Chord, upper wing 40 ft. 0 in., lower wing 30 ft. 0 in. Length, overall 60 ft. 0 in. Height, with fixed propeller 14 ft. 8 in. Height, with all propellers 14 ft. 8 in. Performance—Standard Rate adjustable 300 m.p.h. Power loading—full load 12.3 lb. per sq. ft. Normal pay load per sq. ft. 12.3 lb. Performance with full load three engines: High speed, 138 m.p.h.; cruising speed, 106 m.p.h.; landing speed, 106 m.p.h.; climb to 10,000 ft. 30 min. Rate of climb at ground 570 f.p.m. Climb speed at ground 570 f.p.m. Service ceiling 14,400 ft. Speed at sea level, all engines throttled to 1750 130 m.p.h. Speed at sea level, all engines throttled to 1000 106 m.p.h. Performance, with full load two engines: High speed at ground 137 m.p.h. Service ceiling 13,700 ft. Rate of climb at ground 570 f.p.m. Climb speed at ground 570 f.p.m.

Air Mail Pilot Sets Record

PILOT G. E. Vance of the Boeing Air Transport, Inc., flew an air mail speed record for his trip over the San Francisco-Chicago run. It was recently announced that he flew from Concord Field to Reno in 1 hr. 20 min. with a stop at Sacramento. Flying at an altitude close to 11,000 ft. he made the 96 mi. from Sacramento to Reno in 45 min. 59 sec. average speed of 106 m.p.h. He used a Boeing Mail Plane powered with a Pratt and Whitney "Wasp" engine.

Plan International Air Show

IT HAS been reported that plans are now under way for an international aeronautical exhibition to be held in Berlin, Germany, from March 23, 1933 to April 11, 1933. It comprises a joint showing of commercial and sport planes from all countries in order to make the report regarding the past history of military or civil planes, either by manufacturers, exhibitors or in exhibition or competitive flights.

There will also be booths at the exhibition for manufacturers of airplane engines and accessories of all kinds. Everything pertaining to aeronautics will be on exhibit, including new materials, semi-finished goods and engine fields. Temporary stands and pavilions of aeronautical nature will be represented.

In the partitioning of the exhibition space, the authorities state that absolutely no publicity will be shown, and that foreign exhibitors should be allowed to exhibit on the same basis as the German exhibitors. The day will also include a week of exhibition flying, and competitive flights are being arranged. Complete information regarding the participation in the fair may be obtained from Aeronautische Messen und Verkehrsbüro sent der Stadt Berlin.

Curtiss Receives Plane Order

ACCORDING TO a recent report the War Department has ordered 38 observation planes of the O-11 type from the Curtiss Aeroplane and Motor Co. of Garden City, Long Island, N. Y. The O-11 planes which were developed from the Curtiss O-1, are for use with National Guard units. It is stated that the Curtiss Company is to start delivery about the middle of December, 1937, at the rate of about three planes a week.

In addition the War Department made orders of the same in a special series observation planes, various of which are arranged recently. Curtiss is now being supplied for use of each of the type of planes designated as follows: one model from the Keystone Aircraft Corp., Bristol, Pa.; one from the Douglas Aeroplane Co., Santa Monica, Calif.; and one from the Curtiss Aeroplane and Motor Co., Garden City, N. Y. Upon receipt of these models further study will be made as to the adaptability of the type of plane, known as a four-engine plane, the National Guard and organized reserve flying in the United States.

Bellanca Moves Factory

IT WAS recently reported that the Bellanca Aircraft Corp. of America now located at Arlington, Staten Island, N. Y. is to move the factory to New Castle, Del. A factory site has been chosen adjacent to a tract of 200 acres suitable for a landing field, with a frontage on the Delaware River of 1,100 ft. The Bellanca Company is headed by Giuseppe M. Bellanca, builder of the trans-Atlantic plane, "Colombo".

It is stated that the organization is backed by the du Pont family though it is in no way connected with the E. I. du Pont de Nemours Co. It is interesting to note that three members of the du Pont family are pilots, Francis V. du Pont, Henry H. du Pont, and A. Felix du Pont, Jr. A Felix du Pont is a pilot in the Army Air Corps at Brooks Field, Tex.

The Bellanca Company is now building six planes very similar to the Colombo and it is said that one of these is to be used for a long distance flight.

Keystone Gets Bomber Order

A REPORT from the War Department states that orders for the first production of bombardment planes designed for re-equipment of the bombardment units of the Army Air Corps has been awarded to the Keystone Aircraft Co. of Bristol, Pa. The order is for 35 light bombardment planes of the type LB-5A. They are designed to carry 2000 lb. of bombs at an average speed of 180 m.p.h. with a cruising range of about six hours. Two machine guns will be mounted in the forward cockpit, two in the rear cockpit and one turret gun is designed to shoot through the front. The power is furnished by two Liberty engines, while the fuselage will provide room for a pilot, machine, machine gunner and a bombardier.

These bombardment planes are to be assigned to the bombardment group at Langley Field, Norfolk, Va. They will replace from Langley Field planes now in use there and which are in turn scheduled for shipment to the Air Corps Advanced Flying School, Kelly Field, Texas, for the training of those students operating in bombardment.

Fokker Plane Has Third Wheel

THE TEJA Railroad Co., a subsidiary of the United Fruit Co., recently purchased a Fokker Universal for use as an airframe from Tropicana, Honduras to the south coast of Honduras. As the country in Honduras is rough and broken



Fokker Universal fitted with a third wheel.

extremely hilly, a third wheel was added to the plane. Mr. Morgan, pilot of the new service, tested the plane and especially the landing gear for some time at the Tropicana Airport, N. J. before taking the plane to New Orleans for shipment to Honduras.

Fokker Plane Shipped South

THE FIRST of two Fokker Translons, powered with three Wright Whirlwind engines, for the Pan American Airways, Inc., New York City, was recently delivered for use on the air mail and passenger route between Key West, Fla. and Havana, Cuba. A. A. Proctor, who was operations manager of the Philadelphia Rapid Transit Air Service, Inc. during its operation of the Philadelphia-Washington-Baltimore air mail run has been placed in complete charge of the new line.

Fields Airways Formed

THE FIELDER Airways of New York City, has been organized to offer a complete service in the many different phases of commercial aviation. The company arranges for passenger flights, sightseeing tours, aerial surveys and aerial photography. The company is also offering a development service in connection with the establishment of airports and acts as broker for the different types of commercial aircraft.

AN EAGLE ROCK advertisement as might be written by the man who has never seen one.

This opportunity to tell you about the Eagle Rock ship we with you. There are a couple hundred Alexander ships floating around the U. S. but my job as subway guard makes me a non-fighter and I like out on what's above ground.

I've had to content myself with the door crank as a peep-hole but with a picture of the Eagle Rock which I have from the Alexander home office, the "Aeromaster" (you'd ought to be on the mailing list) as the other hand and the fourth lesson from Cleverness' extra-ordinary book, "Modern Plain" (they sell those for a dollar) tucked away in my mind, I do my duty down.

Say boy, that's some plane. As I bank for a turn at 42nd street I can hear the hum of the wires and think my other I am in a "certified" ship. Handline prop, cockpit covers, tie-down ropes, GNS tools, fire extinguisher, first aid kit, Miller valve system, gas filter, running chart, stream line wires and auto hood coating, all standard equipment.

And they tell me if performance with economy means nothing, they're there in that line and what baby.

The low price of \$2435, Deane field, and the offer to sell on time payments seems to be the result of mass production, whatever that is.



I'm sure you can't go wrong if you buy and I'd trade my job for an Eagle Rock in a minute if I can manage any further than the Bronx.

Sabb-b-b-b! McInerney had to turn his head to save his blubber.



ASSOCIATED WITH ALEXANDER INDUSTRIES
Room 202, Alexander Industries Bldg., Denver, Colo.

which he landed in a most convincing manner. Art Goshel received a splendid reception from the audience when he finished raising some high points in his Efficiency Flight.

Goshel and his party landed at Rodgers Field the day before, in the "Wadsworth" and were met by a large reception committee made up of representatives of the Aero Club and Chamber of Commerce.

Merle Mattingly, ex-mech pilot on the Pittsburgh-Cleveland route, and friend of Goshel's, flew over from Belle Isle to greet him.

The Waverly Oil Company of this city headed by Thomas J. Elford, recently purchased a Waco 16, to be used by the company for rapid transportation of oil. It is being kept at Belle Isle Field, McKeesport, and C. V. Fickling has been selected as pilot.

The Pittsburgh Chapter of the S.E.A. headed by E. W. Cleveland, its president, has opened a membership drive. The opening program of the campaign consisted of a showing of aviation pictures at the Cinema Theatre on all persons who entered, and a special invitation to the members of the Aero Club of Pittsburgh.

Pittsburgh, Pa.

When Col. Charles A. Lindbergh visited Philadelphia in his first official act was to formally dedicate the new Philadelphia Airport on Island Road near Tuscon Avenue, 25 minutes' walking distance from City Hall.

The airport, operated by the Ladington Philadelphia Flying Service, Captain Thomas Ladington, president, received two dedications within a week. Several days previous to the Lindbergh visit, 25,000 Philadelphia residents assembled at the flying field to watch city officials and officers of the Greater Eastwick Improvement Association stage a September ceremony.

The flag and flag-pole were donated to the airport by the Eastwick Association, under whose auspices the celebration was held.

The flag was raised by Mrs. W. Frederick Kesteloch, wife of Philadelphia's mayor.

The Philadelphia Airport is expected to be materially enlarged next year. The present 113 acres at the present time and an additional 90 acres are available adjoining it. The field now is in the shape of a rough diamond and lies in the direction of the prevailing winds. Its longest length is 1,200 ft.

Two large hangars of the 2000 Observation Squadron, P.N.G., and the two Ladington hangars, comprise the port's equipment. In one of the Ladington hangars are stored the planes owned by Philadelphia who are then for sport and business trips.

The Ladington Company has a hangar here on the airport, effective from June 1, this year. Near its new hangar a clubhouse has been erected for the convenience of visiting pilots.

At a representative meeting held at Berwick, Pa., J. Stafford Selim, Jr., of Philadelphia, was elected president of the Pennsylvania Aeronautical Association.

The meeting, held under auspices of the Berwick Aeronautical Association, was attended by several dozen pilots representing cities and towns throughout the state. The Berwick and Lancaster Aeronautical Associations joined the motion membership and plans were laid to extend the list of members other flying associations throughout Pennsylvania. Mr. Selim was interested to appoint a committee to collect plans for completing the representation, the purpose of which will be to compile all possible data for the use of the state.

Among the pilots at the meeting were Jack Ashcraft and

Jack Ashcraft, of Towanda; J. P. Jones, of Lancaster; Lloyd Taylor, of Conshohocken; Henry Malt, of Pottsville; J. M. Gage, and C. W. Warner, of Millersburg; E. D. Whipple, of Chambersburg; G. A. Newman, of Monaca; Robert P. Hewitt, of Harrisburg; J. G. Galt, of Philadelphia; J. H. Galt, of Harrisburg; Fred Nelson, of Millersburg; William Taylor, of Lancaster; Hyman Weissman, of Berwick; and Harry Hodge, of West Pittsburg.

Cap. Hugh L. Widdough, 31 years old, was one of the Philadelphia Airport visitors recently. Known to the aviation industry as the man who claims to be the world's oldest pilot, Captain Widdough flew in Philadelphia and landed at Conner place. He expects to convert it into a airport.

The captain is dividing his time, these days, between Newport and Florida.

"Al" Graham, one of the best known of Philadelphia's aviation enthusiasts, arrived at the Philadelphia Airport with a new American Eagle plane which he flew from Kansas City.

The Ladington Philadelphia Flying Service, Philadelphia Airport tower, has completed the installation of 36 field boundary lights around the 113 acres at the airport. The lights, placed at intervals of about fifty feet, are red, white and green, the red lights forming dangerous landing spots and obstacles, the green lights denoting the most favorable landing place and the white lights indicating the star landing spot.

Depth of the boundary light installation brings the airport to a new building program in a successful way, at the present time. The equipment includes a 500-horsepower outboard field floodlight, a flashing beacon on top of one of the large hangars that flashes the letter "P" in the Conner road every night, floodlights on top of the second hangar, an illuminated "road" and various other lights at and near the five hangars.

Superior Robinson, of Delaware, will place before the state board of the next session a plan for the fortification of the quarantine station near Lewes, Del., and its landmasses, his late an aviation expert to guard the isolation station of the Atlantic coast line.

If the plan is adopted, Philadelphia, Washington, Baltimore, Wilmington and their neighboring towns would be protected against possible air attacks launched from foreign lands in time of war.

If it is established, the airport would defend the Philadelphia Navy Yard, the Washington, D. C. Navy Yard, the aviation plants at Baltimore, Myrtle, Bethlehem and Sparrow Point, the powder and high explosive plants of the du Ponts, the chemical warfare plants in Baltimore and other plants producing war material.

Pennsylvania Aviation, Inc., has announced the delivery of two new Eastern Electric Defense planes. Three-horsepower with 654 engine. One was sold to Eugene Terzaghi, of Bound Brook, and the second went to a resident of Reading, Pa.

P. Thomas Devision, Assistant Secretary of War for Aviation, has died off at Potomac Field, Md., after a long illness, and left his place at the field amongst what he called "Philadelphia." He was buried north on a highway and was flying a Douglas O-2.

When Felix de Pont, Jr., one of the vice-presidents of the F. L. de Pont de Nemours Company, of Wilmington, has been killed in the United States Army as a cadet pilot.

Mr. F. de Pont left immediately after his enlistment for World War I, near San Antonio, Tex., where 1,300 other cadets were taking the Army course. He took his preliminary test at Boston, three months prior to his enlistment and passed a passing mark.

The AIRSEDAN



The Leader of the Top Flight Class

SPECIFICATIONS

Weight empty 2100 lbs.
Wing Span 41 feet
Wing Area 220 sq. ft.
Length 18 feet
Fuel Load 1000 lbs.
Loading Capacity, Pilot and 4 Passengers

PERFORMANCE

High Speed (50 mph) ... 120 M.P.H.
Landing Speed 41 "
Climbing Speed 300 "
Service Ceiling 14000 feet

POWER PLANT

Weight Whorl 175 lbs.
Horsepower 300 at 1600 R.P.M.
Fuel Capacity 75 gals.
Oil Capacity 4 gals.

EQUIPMENT

Self Starter, Brakes, Metal Propeller, Compass, Air Speed Indicator, Gyroscopic Light, Radio, Altimeter, Clock, Fuel Gauge, Fuel, Oil Pressure and Oil Temperature Gauges, Air Choke Throttle, Governor and Fuel Valve, Wing type exhaust manifold with muffler and valve lever.

The Airsedan is not equipped with adjustable seat. Exceptional stability and balance under varying loads make this feature unnecessary.

Price \$12,500

Flyaway, Our Field

BUHL AIRCRAFT CO.

Marysville, Michigan

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COMPLETE FLYING COURSE, 15 HOURS, \$300

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"The School of Superior Flying"

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LEARN TO FLY AT A REPUTABLE SCHOOL

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PORTLAND FLYING SCHOOL

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2-DOZER FLYING SCHOOL, Flying Club at Fort City, S. C.

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INDIAN LAKE AVIATION COMPANY

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2-DOZER FLYING SCHOOL, Flying Club at Fort City, S. C.

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PITCAIRN AVIATION OF VIRGINIA, INC.

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AERONAUTIC SAFETY CODE

A Compilation of the Results of Four Years' Study by Leading Engineers, and Government and Civilian Experts of the Aircraft Industry

Sponsored by the U. S. Bureau of Standards and Society of Automotive Engineers, and Approved by the American Engineering Standards Committee, October, 1935.

The Aeronautic Safety Code covers

GOOD PRACTICE AND SAFE METHODS in the Design, Construction, Testing, Operation and Maintenance of Aircraft, Aircraft Engines and Accessories, Airframe and Airway Equipment

It includes

SENSIBLE RULES OF THE ROAD AND SAFETY PRECAUTIONS FOR FLYING AND GROUND PERSONNEL

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